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IN THE

Supreme Court of the United States

STATE OF WISCONSIN, STATE OF MINNESOTA, STATE OF OHIO, and STATE OF PENNSYLVANIA, *Complainants,* *vs.* STATE OF ILLINOIS and THE SANITARY DISTRICT OF CHICAGO, *Defendants.* STATE OF MISSOURI, STATE OF KENTUCKY, STATE OF TENNESSEE, STATE OF LOUISIANA, STATE OF MISSISSIPPI, and STATE OF ARKANSAS, *Intervening Defendants.*	No. [redacted] Original.	2
STATE OF MICHIGAN, *Complainant,* *vs.* STATE OF ILLINOIS and THE SANITARY DISTRICT OF CHICAGO, et al., *Defendants.*	No. [redacted] Original.	3
STATE OF NEW YORK, *Complainant,* *vs.* STATE OF ILLINOIS and THE SANITARY DISTRICT OF CHICAGO, et al., *Defendants.*	No. [redacted] Original.	4

FINAL SEMI-ANNUAL REPORT OF THE SANITARY DISTRICT OF CHICAGO, JANUARY 1, 1939, MADE PURSUANT TO DECREE OF APRIL 21, 1930.

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IN THE

Supreme Court of the United States

NOS. 5, 8 AND 9, ORIGINAL.

OCTOBER TERM, [redacted] 1938

STATE OF WISCONSIN, STATE OF MINNESOTA, STATE OF OHIO, and STATE OF PENNSYLVANIA, *Complainants,* vs. STATE OF ILLINOIS and THE SANITARY DISTRICT OF CHICAGO, *Defendants.* STATE OF MISSOURI, STATE OF KENTUCKY, STATE OF TENNESSEE, STATE OF LOUISIANA, STATE OF MISSISSIPPI, and STATE OF ARKANSAS, *Intervening Defendants.*	No. 5, Original.
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FINAL SEMI-ANNUAL REPORT OF THE SANITARY DISTRICT OF CHICAGO, JANUARY 1, 1939, MADE PURSUANT TO DECREE OF APRIL 21, 1930.

Pursuant to provisions of paragraph numbered 5 of the Decree in the above entitled causes, entered on April 21, 1930, the Defendant, The Sanitary District of Chicago, hereby makes its final semi-annual report, January 1, 1939, as follows:

CONSTRUCTION PROGRAM.

In the semi-annual report of July 1, 1938, the status of completed work in the sewage treatment construction program involved in this case was stated to be on June 1, 1938, as follows:

TABLE 1.

COMPLETED WORK AS OF JUNE 1, 1938.

Calumet Project	$ 31,242,818.18
North Side Project	38,113,746.90
West Side Project	52,723,986.51
Southwest Side Project	18,178,325.93
West-Southwest Treatment Plant	11,551,617.24
Miscellaneous Plants and Sewers	632,961.20
Chicago River Controlling Works	1,964,899.73
Total	$154,408,255.69

The estimated cost of future essential sewage treatment construction, as of June 1, 1938, was as follows:

TABLE 2.

FUTURE WORK AFTER JUNE 1, 1938.

Calumet Project	$ 1,281,000.00
North Side Project	480,000.00
West Side Project	200,000.00
Southwest Side Project	2,760,000.00
West-Southwest Treatment Plant	16,696,000.00
Chicago River Controlling Works	926,000.00
Total	$22,343,000.00

During the six months between the date of the last report and the present report a considerable amount of construction work has been accomplished on the Calumet, the North Side and the Southwest Side Sewage Treatment Projects and on the Chicago River Control Works.

The Calumet and North Side Projects and the Chicago River Control Works are physically completed

to the point where they have been placed in full service. The Southwest Side sewer system is completed except for the Racine Avenue Pumping Station and can function for the interception of sewage under all ordinary conditions without the Racine Avenue Station which is designed for control under storm flow conditions. The Southwest Side intercepting sewer however cannot be placed in service until the West-Southwest Treatment Plant is in operation. Under the construction program the West-Southwest Treatment Plant was planned to be ready for service before December 1, 1938. The agreement with the Federal Emergency Administration of Public Works, through which funds were obtained for this construction, provided for completion by December 1, 1938. It became impossible to complete certain portions of the work on the West-Southwest Treatment Plant before December 1, 1938, through circumstances beyond the control of the Sanitary District, involving rejection of bids and re-advertisement for new bids on certain important contracts, also construction delays caused by strikes, etc. Thus the sequence of the work was so interrupted that it was physically impossible to meet the completion date in the agreement.

The Sanitary District of Chicago has requested the Public Works Administration to extend the date of the completion of the P.W.A. agreement from December 1, 1938 to September 1, 1939. To this the Public Works Administration will undoubtedly consent. It is expected that all the physical work covered by this agreement will be completed before July 1, 1939. Since it was impossible to put the West-Southwest

Sewage Treatment Plant in service by December 1, 1938, the operation of this plant was postponed to avoid starting during winter weather. The plant should be started in March 1939, and be in complete operation by June 1939. Certain contracts in the Project, involving the testing of equipment after actual service, cannot be completed until after the plant is in operation.

Calumet Project. Construction was continued on the new sludge conveying equipment at the Calumet sludge disposal plant and this work is now 100 per cent completed.

Construction was continued on the Blue Island Intercepting sewer, now 100 per cent completed, and on the connections to the Blue Island Intercepting sewer, which work was 98 per cent completed on December 1, 1938.

North Side Project. Construction was continued on the construction of a sewer and pumping station in Niles and on the construction of siphons under the North Shore Channel. Both projects are now 100 per cent completed.

Southwest Side Project. Work was continued on the fabrication of pumps for the Racine Avenue Pumping Station, this contract now being 91 per cent completed. Construction was continued on the substructure of the Racine Avenue Pumping Station, the work now being 42 per cent completed. Contracts were awarded for the erection of the superstructure of the Racine Avenue Pumping Station on September 1, 1938, and for the electrical work on this Station

on September 22, 1938, this work now being 6 per cent completed. In connection with the Racine Avenue Pumping Station, only one contract remains to be let, namely, that for mechanical work and erection of machinery, which will probably be awarded in January 1939.

The construction of the small pumping station for the Upper Des Plaines sewer is now 100 per cent completed and the entire Upper Des Plaines sewer has been placed in service.

West-Southwest Treatment Plant. Construction was continued on the following contracts mentioned in the last semi-annual report to the Court: Aeration Tanks, Operating Galleries, Final Settling Tanks, etc., now 98 per cent completed; Electrical Work in connection with Aeration Tanks, etc., now 100 per cent completed; Erection of Machinery and Auxiliary Equipment, now 97 per cent completed; Electrical Work in the Pumping Station, now 77 per cent completed; Main Influent and Effluent Conduits, now 97 per cent completed; Electrical Work in connection with Conduits, now 95 per cent completed; Preliminary Settling Tanks, now 97 per cent completed; Superstructure of the Incineration Plant, now 99 per cent completed; Electrical Work in connection with the Incineration Plant, now 91 per cent completed; Piping and Miscellaneous Equipment in the Pump and Blower House, now 98 per cent completed; Piping and Miscellaneous Equipment in the Incineration Plant, now 81 per cent completed; Sludge Concentration Tanks and Miscellaneous Work, now 69 per cent completed.

A contract for Insulation in the Incineration Plant was awarded July 28, 1938, and this work is now 38 per cent completed. A contract for Electrical Duct Lines was awarded September 1, 1938, and this work is now 59 per cent completed. A contract for Trash Racks was awarded September 22, 1938, and this work is now 35 per cent completed.

The fabrication of the following equipment which was referred to in the last report to the Court was continued and is now all practically completed: Steam Turbine driven Pumping Units, now 100 per cent completed; Steam Turbine driven Blower Units now 100 per cent completed; Sludge Removal Mechanisms, now 100 per cent completed; Venturi Meters, now 100 per cent completed; Meters in connection with the Effluent Conduits, now 100 per cent completed; Valves and Sluice Gates in connection with the Effluent Conduits, now 93 per cent completed; Steam Turbine driven Generator Units, now 99 per cent completed; Transformers, now 100 per cent completed; Boiler Feed Water Heaters, now 100 per cent completed; Boilers and Settings, now 99 per cent completed; Heat Exchangers, now 99 per cent completed; Preliminary Tank Mechanisms, now 94 per cent completed; Vacuum Filters, now 97 per cent completed; Sludge and Coal Conveying Equipment, now 98 per cent completed; Sludge Drying Equipment, now 99 per cent completed; Precipitators, now 99 per cent completed; and Ash Handling Equipment, now 77 per cent completed.

Two minor contracts remain to be awarded in connection with the West-Southwest Treatment Plant, namely, a contract for Miscellaneous Work, which is

really a clean-up contract, now advertised, probably to be awarded in January 1939, and a contract for Painting Machinery and Equipment in the Pumping Station and Incineration Plant to be let not later than February 1939.

At the present time 98 per cent of the 400 M.G.D. West-Southwest Sewage Treatment Plant has been placed under contract and 90 per cent of the total plant completed. It is expected that the plant will be entirely completed and placed in full service by June 1939.

Control Works, Chicago River. The contract for the construction of the Lock, Guide Walls, etc., comprising about 75 per cent of the entire Control Works has been entirely completed and the Lock was officially dedicated on September 7, 1938. The contract for Electrical Work in connection with the Lock has also been completed. Work has been continued on the construction of the Cross Walls connecting the Lock with the shore and on the Control Gates and this work is now 93 per cent completed. The last section of Wall was placed December 15, 1938, and there is now a tight barrier between the Chicago River and Lake Michigan. The work not yet completed consists of a concrete slab along the top of the North Cross Wall, well above the water line. For all effective purposes the Control Works may be considered complete and operable.

Financial. The financial condition of The Sanitary District of Chicago has changed little since the time of last semi-annual report to the Court. The local tax situation has not improved. The taxes collected and turned over to the Sanitary District for corporate

purposes and bond service since the time of the last report to the Court amounted to $9,057,903.74. The bonds of the Sanitary District now outstanding amount to $120,864,890. On January 1, 1939, some $3,380,500 of these bonds will be redeemed, leaving $117,484,390 then outstanding. The constitutional debt limit of The Sanitary District of Chicago, which includes bonds and other obligations, based on the 1937 assessed valuation of property, is $122,861,672.

Progress of Work. The total work accomplished by The Sanitary District of Chicago in the construction of sewage treatment works during the period from June 1, 1938 (the date of the summaries for the last report) to December 1, 1938 (the date of the summaries for this report) as measured by construction expenditures was, as follows:

TABLE 3.

Calumet Project	$1,237,415.55
North Side Project	229,422.29
West Side Project	368,562.66
Southwest Side Project	587,026.84
West-Southwest Treatment Plant	2,334,446.55
Miscellaneous Plants and Sewers	1,601.78
Chicago River Controlling Works	628,500.34
Total	$5,386,976.01

In addition to the amounts shown in Table 3, approximately $758,700 had been earned by contractors up to December 1, 1938, on the various items of construction work, but had not been paid, being retained by the Sanitary District as reserved percentage until the final completion of the contracts.

By adding the various items indicated in Table 3 to corresponding items in Table 1, the completed portion of the sewage treatment construction program on December 1, 1938, was as follows:

TABLE 4.

COMPLETED WORK AS OF DECEMBER 1, 1938.

Calumet Project	$ 32,480,233.73
North Side Project	38,343,169.19
West Side Project	53,092,549.17
Southwest Side Project	18,765,352.77
West-Southwest Treatment Plant	13,886,063.79
Miscellaneous Plants and Sewers	634,562.98
Chicago River Controlling Works	2,593,400.07
Total	$159,795,331.70

The estimated cost of future essential sewage treatment construction, as of December 1, 1938, is as follows:

TABLE 5.

FUTURE WORK AFTER DECEMBER 1, 1938.

Calumet Project	$ 302,000
North Side Project	290,000
West Side Project	200,000
Southwest Side Project	2,443,000
West-Southwest Treatment Plant	10,895,000
Chicago River Controlling Works	330,000
Total	$14,460,000

Funds remaining unexpended from the amounts obtained under the agreement of September 21, 1935, with the Federal Emergency Administration of Public Works to the extent of $3,730,000 are available and will be used for this future work. This leaves essential work to the extent of $10,730,000 to be financed from other sources. The Sanitary District hopes to be able to finance this work over the next two years assuming tax collections and assessed valuations to remain the same as at present and assuming the possibility of Federal aid in this construction.

SEWAGE TREATMENT.

The population of The Sanitary District of Chicago, as of January 1, 1939, is about 4,684,000, according to estimates made from the figures of the 1930 census. The industrial wastes in the Sanitary District are assumed to be equivalent to sewage of 1,810,000 additional persons. Hence, the total population and industrial wastes equivalent amount to 6,494,000. This figure includes the Corn Products wastes, which would have been equivalent to the sewage of 425,000 persons if no recovery had been accomplished. These wastes have been greatly reduced, as a result of certain experimental work initiated by the Sanitary District.

The January 1, 1939, total population and industrial waste equivalent, as above indicated, are estimated as 6,494,000. Up to date, the Sanitary District has assumed that so-called complete sewage treatment could produce an annual average of 85 per cent purification. Hence, so-called complete treatment as of January 1, 1939, for the total population and industrial wastes equivalent would equal the 100 per cent treatment of the sewage of 5,520,000, which is 85 per cent of 6,494,000.

The expenditures for sewage treatment have been indicated in Tables 1, 3, and 4. The amounts of actual sewage treatment in operation on June 25, 1938 (as of the time of the last report to the Supreme Court) and at the present time are shown in Tables 6 and 7, following:

TABLE 6.

ACTUAL SEWAGE TREATMENT IN OPERATION AS OF JUNE 25, 1938.

Treatment Works	Population Equivalent	Percentage Treatment	Treatment 100 Per Cent Basis
Calumet	362,000	85	308,000
North Side	1,268,000	85	1,078,000
West Side (Sedimentation)	1,644,000	33⅓	548,000
Miscellaneous (Morton Grove, Glenview, Northbrook)	8,000	85	7,000
Corn Products (Reduction)	423,000	91.5	387,000
Total Treated	3,705,000	62.8	2,328,000
Not Treated	2,770,000	0	0
Total Population	6,475,000	35.9	2,328,000

TABLE 7.

ACTUAL SEWAGE TREATMENT IN OPERATION AS OF DECEMBER 31, 1938.

Treatment Works	Population Equivalent	Percentage Treatment	Treatment 100 Per Cent Basis
Calumet	444,000	85	377,000
North Side	1,291,000	85	1,097,000
West Side (Sedimentation)	1,722,000	33⅓	574,000
Miscellaneous (Morton Grove, Glenview, Northbrook)	6,000	85	5,000
Corn Products (Reduction)	425,000	91.5	389,000
Total Treated	3,888,000	62.8	2,442,000
Not Treated	2,606,000	0	0
Total Population	6,494,000	37.7	2,442,000

The extent of the operation of sewage treatment plants at the present time is equal to the 100 per cent treatment of the sewage of 2,442,000 out of 5,520,000 persons, which would be the present possible 100 per cent treatment if the sewage of the total population and industrial wastes equivalent of 6,494,000 were being treated. This indicates the actual treatment of approximately 44.2 per cent of the total sewage

within the Sanitary District. The 37.7 per cent treatment of 6,494,000 shown in Table 7 is 85 per cent of the above 44.2 per cent.

In the spring of 1939 the completion of a sewer now under construction by the City of Chicago will bring the sewage of 89,000 additional people to the West Side works for treatment, to the extent of 33⅓ per cent. The West-Southwest sewage treatment plant will also be placed in service in the spring of 1939 but in the usual procedure of tuning up will probably not function to best advantage before June 1939. This plant will treat to the extent of 85 per cent, the sewage of 1,277,000 additional persons as well as indusrial wastes (principally from the Stock Yards) equivalent to the sewage of about 1,185,000 people, or a total equivalent population of 2,462,000. The population figures cited are as of January 1, 1939, and of course will change by July 1, 1939, but using these figures for comparative purposes, the actual sewage treatment in operation after the completion of all the work now in progress will be as shown in Table 8, following:

TABLE 8.

Treatment Works	Population Equivalent	Percentage Treatment	Treatment 100 Per Cent Basis
Calumet	444,000	85	377,000
North Side	1,291,000	85	1,097,000
West Side (Sedimentation)	1,811,000	33⅓	604,000
Southwest Side	2,462,000	85	2,093,000
Miscellaneous (Morton Grove, Glenview, Northbrook)	6,000	85	5,000
Corn Products (Reduction)	425,000	91.5	389,000
Total Treated	6,439,000	71.5	4,565,000
Not Intercepted	55,000	0	0
Total Population	6,494,000	70.4	4,565,000

The addition of complete treatment facilities to the West Side sewage treatment works, the final step in the sewage treatment program, will increase the treatment of the sewage of 1,811,000 population from 33⅓ per cent to 85 per cent, increasing this treatment on a 100 per cent basis from 604,000 to 1,539,000. This addition to the West Side Works will be undertaken as soon as possible after the starting of operation at the West-Southwest works. It will increase the extent of treatment of sewage of the total population from the present 37.7 per cent and the July 1, 1939, figure of 70.4 per cent to an ultimate of 84.7 per cent. When and if the sewage of the remaining 55,000 people is intercepted and treated the percentage of treatment will be increased to 85.

The statements in the preceding paragraphs may be more clearly visualized in the following tabular form:

TABLE 9.

	Population Equivalent	Percentage Treatment	Treatment 100 Per Cent Basis
As of June 25, 1938			
Treated	3,705,000	62.3	2,328,000
Not Treated	2,770,000	0	0
Total	6,475,000	35.9	2,328,000
As of December 31, 1938			
Treated	3,888,000	62.8	2,442,000
Not Treated	2,606,000	0	0
Total	6,494,000	37.7	2,442,000
As of July 1, 1939			
Treated	6,439,000	71.5	4,565,000
Not Treated	55,000	0	0
Total	6,494,000	70.4	4,565,000
After Complete Treatment at West Side Works			
Treated	6,439,000	85.4	5,500,000
Not Treated	55,000	0	0
Total	6,494,000	84.7	5,500,000
Ultimate Treatment			
Total	6,494,000	85	5,520,000

The effect of this sewage treatment in its various stages on the water in the Illinois Waterway and the Illinois River is well illustrated by certain comparisons. The figures of treatment on the 100 per cent basis in Table 9 may be taken as a measure of the wastes removed from the sewage and the difference between such figures and the total population equivalent may be taken as a measure of the wastes remaining. It may be assumed that the sewage and wastes remaining are equivalent to the raw sewage from a population equal to the figure thus derived as the measure of the sewage and wastes remaining. The results will be as in Table 10, following:

TABLE 10.

Date	Total Population Equivalent	Treatment 100 Per Cent Basis	Sewage and Wastes Remaining Equivalent to Sewage from Population of
June 25, 1938.....	6,475,000	2,328,000	4,147,000
Dec. 31, 1938.....	6,494,000	2,442,000	4,052,000
July 1, 1939.....	6,494,000	4,565,000	1,929,000
After Complete Treatment			
West Side	6,494,000	5,500,000	994,000
Ultimate	6,494,000	5,520,000	974,000

The sewage and wastes remaining equivalent to the sewage from the various populations and the fresh water available for the dilution and the ultimate natural purification of such remaining wastes has been and will be as follows, with the present diversion of water from the Lake Michigan watershed of 5,000 cubic feet per second annual average and the reduction of this diversion to 1,500 c.f.s. after December 31, 1938:

TABLE 11.

	Diluting Water C.F.S.	Sewage and Wastes Remaining Equivalent to Sewage of Population of	Diluting Water Per 1000 Persons C.F.S.
June to December 1938	5,000	4,147,000	1.21
January to June 1939	1,500	4,052,000	0.37
July 1939 to Complete Treatment West Side	1,500	1,929,000	0.78
After Complete Treatment West Side	1,500	994,000	1.51
Ultimate	1,500	974,000	1.54

The dilution ratio in effect over the past six months has been 1.21 c.f.s. of fresh water per 1000 persons and during the next six months will be 0.37 c.f.s. after which it will be 0.78 c.f.s. until complete treatment facilities have been provided at the West Side works; when it will become 1.51 c.f.s. for the time being. These figures are all slightly higher than the actual ratios because the increase in population has been ignored. In general, a ratio of a minimum of approximately 5 c.f.s. to 6 c.f.s. of water per 1,000 persons is required if sewage is to be adequately disposed of by dilution.

It is reasonably certain that the conditions which will prevail during the early part of 1939 would, if continued, produce nuisance in the Illinois Waterway, particularly in the pools back of the dams at the northern end. It is also extremely probable that the conditions which will prevail after July 1, 1939, will cause nuisance on this waterway, especially during the summer or navigation season. This waterway, though under construction at the time of the trial of the case of Wisconsin, et al vs. the State of Illinois and The Sanitary District of Chicago, et al, was not

then an authorized Federal project and was eliminated from the case. Conditions have now changed. The Chicago Sanitary and Ship Canal, the Calumet Sag Channel and the Illinois Waterway were made Federal navigation projects, by the Rivers and Harbors Act of July 3, 1930. The unsanitary conditions which will be produced in this Federal waterway when and if the diversion of the waters of the Great Lakes-St. Lawrence system or watershed are reduced below an annual average of 1,500 cubic feet per second are of interest to the Court and may reasonably be considered good cause for not making this reduction now; or if presently made, provide good cause for not making the reduction irrevocable.

DIVERSION OF WATER.

The net diversion of water from Lake Michigan, the domestic pumpage of the Chicago metropolitan area, the inflow from the Des Plaines River and the total flow from the Main Channel at Lockport, for the years 1930 to 1938, have been as indicated in the table following:

Year	Total Flow from Main Channel at Lockport C.F.S.	Inflow from Des Plaines River C.F.S.	Domestic Pumpage Chicago Metropolitan Area C.F.S.	Net Diversion from Lake Michigan C.F.S.
1930 6 mo. (Jan. to June)	8500	0	1680	6820
1930 6 mo. (July to Dec.)	8216	0	1719	6497
1931	8180	0	1680	6500
1932	8100	2	1650	6450
1933	8005	45	1690	6270
1934	8125	0	1692	6433
1935	8093	7	1602	6484
1936	6607	33	1712	4862
1937	6677	23	1665	4989
1938 to Dec. 20	6630	45	1605	4480

Diversion of water from Lake Michigan by The Sanitary District of Chicago since July 1, 1930, has been made in accordance with a Permit from the Secretary of War, dated June 26, 1930, which authorized the diversion of water as specified in the Decree of the Supreme Court, handed down April 21, 1930. This limited the net diversion to an annual average of not more than 6,500 cubic feet per second up to December 31, 1935, and thereafter limits the net diversion to an annual average of not more than 5,000 cubic feet per second up to December 31, 1938. The average monthly diversion, as made under this Permit from January 1 to December 20, 1938, is indicated in the table following:

Month 1938	Total Flow from Main Channel at Lockport C.F.S.	Inflow from Des Plaines River C.F.S.	Domestic Pumpage Chicago Metropolitan Area C.F.S.	Net Diversion from Lake Michigan C.F.S.
January	6408	20	1589	4799
February	7422	63	1554	5805
March	7607	25	1534	6048
April	7686	22	1529	6135
May	6311	13	1563	4735
June	6701	28	1649	5024
July	6814	305	1761	4748
August	6740	11	1808	4921
September ...	7247	25	1683	5539
October	5512	11	1577	3924
November ...	5861	9	1514	4338
Dec. 1 to 20..	5246	5	1496	5745
Average	6630	45	1605	4480

By the time of the filing of this report the Sanitary District of Chicago will have accepted the reduction in the diversion of water from the Great Lakes-St. Lawrence watershed to 1500 cubic feet per second, annual average, as prescribed in the decree

of this Court of April 21, 1930. Therefore, this will be the final semi-annual report unless this Court shall otherwise direct.

All of which is respectfully submitted,

THE SANITARY DISTRICT OF CHICAGO,

By ROSS A. WOODHULL,
President.

WILLIAM H. TRINKAUS,
Chief Engineer.

ERNST BUEHLER,
Attorney.

Attest:

JAMES J. SULLIVAN,
Clerk.